



T E C H N I C A L B R I E F

Early Warning Systems for Contaminant Detection in Drinking Water Systems

Background

The attacks of September 11, 2001, and recent events involving the identification of water system vulnerabilities have elevated concerns about intentional threats to the nation's water systems. In response to these concerns, EPA's National Homeland Security Research Center (NHSRC), Water Infrastructure Protection Division (WIPD), headquartered in Cincinnati, Ohio, has implemented a three-phase program to test and evaluate early warning systems for drinking water infrastructures. An early warning system (EWS) is an integrated system for monitoring, analyzing, interpreting, and communicating water system data. It can enable decision makers to respond quickly and effectively to protect public health in the event of intentional water system contamination.

EWS Research

An EWS includes sensors to detect the contaminant, systems to acquire and analyze data, links for communication and notification, and protocols for decision making and emergency response. To be widely used, an EWS must be able to detect both a range of contaminants and the source of contamination. It must also be automated, robust, affordable, easy to use, and capable of remote operation. NHSRC researchers conduct evaluations to determine whether a proposed EWS satisfies these requirements. The focus of EWS research is on permanent, real-time, continuous monitoring systems; however, researchers are also evaluating interim EWSs for use until these permanent systems are available.

As part of the first phase of this program, researchers are compiling a background paper that will include a review of state-of-the-art EWSs. The paper will also summarize and evaluate current and emerging EWS technologies that identify general categories of chemical, microbial, and radiological contaminants. This report will also identify future directions, technical issues, and existing research gaps. To prepare this report, researchers are gathering information from a variety of sources, including both vendors and government agencies. This research also involves gathering expert opinions and information on verification and field case studies.

In the second phase of this program, researchers will conduct pilot-scale testing using EWS devices. Testing will employ both third-party developed protocols and standardized methods to evaluate the performance of existing and newly developed EWS technologies.

The third phase of this program involves carrying out field studies and sensor evaluations using a test bed located at an operating water utility. During this phase of the program, researchers will design a field-test system and conduct studies to determine the optimal placement of sensors and detectors.

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Information generated during the field tests will provide water utility operators with the data necessary to make informed decisions regarding the implementation of EWSs.

EWS Evaluation Program Products

Reports will be prepared after each phase of the project to summarize research results. A handbook that will incorporate the results of all three phases of the project will also be prepared. The handbook will identify qualifying protocols and technologies that water utility operators can use in testing sensors and detectors.

Users of EWS Evaluation Program Products

Users of the EWS product research include water utility operators, water organizations, monitoring technology and system developers, and vendors.

For more information, visit the NHSRC Web site at www.epa.gov/nhsrc.

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